6

THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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THE SHUT-EYE SKEPTIC

By Dr. Edwin E. Slosson.

The history of science follows the plan of the catechism. Each new topic begins with a question.

"First catch your hare. Then take it apart," was the rule of the old cook book. "First catch your fact. Then take it apart," is the rule of scientific procedure.

Whenever a scientist is called upon to explain something strange he asks "Is it so?", before attempting to account for it. He knows the natural credulity of man so well that he is very reluctant to accept on anybody's say-so an unverified statement.

This is what is known as "scientific skepticism" which is quite the proper attitude of mind if taken in its primary meaning. For the skeptic is, by derivation of the term, the man who sees, who looks into things, who keeps his eyes open. But on account of the natural tendency of words and men to deteriorate the skeptic may in the course of time come to mean one who shuts his eyes and refuses to see what is plain to other folks. For that reason science has had sometimes to retrace its steps and pick up something that it had overlooked or deliberately rejected.

An amusing instance of this is found in the history of meteorites. The ancients saw nothing incredible in the falling of stones from heaven. Heaven was to them only a sort of upper story of the earth. It was a roof to the world, just high enough to clear the mountain tops and quite as substantial. That there were chinks in the blue-painted ceiling could be seen at night when light leaked through, and it was not surprising that occasionally a stone got knocked off the battlements like a tile from a roof. The gods, especially Jupiter and Thor, threw stones and thunder-bolts at one another in their upstairs quarrels, and sometimes missed their aim, like mortals, and then these missiles fell to the earth.

So we find learned men, like Livy, Pliny and Plutarch, recording the fall of meteorites, together with other information, true and false, in the field of "meteorology". But when we come down to the "Era of Enlightenment" of the eighteenth century we find arising a skeptical spirit. The old myths and superstitions were ruthlessly swept away and with this mass of rubbish a few grains of truth. The telescope had knocked the roof off the world and removed the stars to unmeasurable distance. It was known that above the earth and below it was

empty space. There was no loft aloft in which stones could be stored. The museums which had preserved stones said to have fallen from heaven took them out of the exhibition cases and threw them away lest the museum should be laughed at for preserving such relics of superstition.

Nevertheless stones continued to fall. But rarely and in remote places, so they could be disposed of by denial. In 1751 a meteorite was reported to have fallen in Agram. But Agram was inhabited by southern Slavs who could not be expected to know any better. In an enlightened land like Germany they knew better, at least they had learned better by 1790, when Professor Stuetz wrote "that iron should fall from heaven might in 1751 have been believed even in Germany by sensible people on account of the then prevailing ignorance of natural history and physics, but in our time it would be impossible for such fables to find credence".

But in that same year, 1790, a meteorite fell in Juillac, France. It came blazing through the sky and exploded with such a bang that everybody there knew about it and fragments could be picked up. The mayor of the town sent in to the French Academy of Sciences a report of it attested by three hundred witnesses.

What do you suppose that learned body did with the document? You might know if you had had any experience with such bodies. The matter was referred to a committee.

But the referee, M. Bertholon, could see in it nothing but a deplorable example of the persistence of popular credulity. In his report to the Academy he expressed his pity for the community which had a mayor so stupid as to believe such stories. "Is it not sad," he said, "to see a whole municipality attesting in a formal protocol to a popular superstition? The philosophical reader can find nothing to say when he sees this authenticated testimony to an obviously false statement, a physically impossible phenomenon." The savant, A. Deluc, expressed the prevailing attitude more emphatically when he declared that if such a stone should fall at his feet he would have to admit that he had seen it but he could never believe it.

But what was then so impossible that a wise man would refuse to believe his own eyes is now universally accepted. The museums again take pride in exhibiting meteorites. The biggest known, a mass of meteoric iron weighing more than thirty-seven tons, brought by Peary from Greenland, may be seen at the entrance of the American Museum of Natural History at New York. And it is estimated that 100,000 tons of meteoric dust and stones fall annually upon the earth. Every fall and find is eagerly examined to see if it brings us any news of other worlds than ours. But of the thirty elements found in meteorites there is none that was not already known on earth, though the combinations and proportions are somewhat different. These visitors evidently come from where water and air are limited or lacking, but otherwise they are made of much the same stuff as our own earth.

RASMUSSEN FINDS AN ESKIMO WHO IS A GREAT POET

By Knud Rasmussen,
Leader, Danish Arctic Expedition,
Now in Far North.

Written at Arviligjuaq, Pelly Bay, near Magnetic North Pole.

(Rasmussen and his party travelling by sledges across northern Canada are visiting an Eskimo family whose head is Willow-Wand, a believer in magic and charms.)

(Continued from last week's News-Letter)

I wrote down a number of Willow-Wand's songs. He had great imagination and a sensitive mind that was a peculiar combination in this robust barbarian.

Without knowing it Willow-Wand was a great poet. When he had nothing to do he sang, and he called his songs "comrades in solitude". Here is a song he called "My Breath". The melody, which was extremely monotonous, I unfortunately could not take down. The words run as follows:

Let me sing a song
A song about myself,
Sick since autumn I have lain
Weakened like a child.
   Unaja   Unaja.

Saddened, I desire
My wife to another house
To a man who can be
Her refuge,
Secure and firm as winter's ice.
Saddened, I desire her to go
To a better protector
Now my strength fails me
That I scarce can lift my head.
   Unaja   Unaja

Knowest thou fate?
I lie weak and cannot rise
Memories alone are strong.
I feel no more that whilom strength
When chasing the game in the mountains.
Weakened I lie on the bear skin
Only the memories are strong.
   Unaja   Unaja

See --
I remember now
The great white plain
At the narrowing of the ford
The bear
Who attacked and stunned me
With one blow.
It thought itself alone, so powerful
So invincible.

See --
I remember
How it rushed at full speed
Casting me down,
But without killing me
It fled from me:
Taking me for a man
It dared not encounter.
Stunned I lay upon the ice.
When again consciousness returned
I sprang up
Caught it up at an ice-barrier
And speared it,
   Unaja   Unaja

Now, I lie ill,
Wishing my woman away
To a strange house
To a man who may be
Her refuge,
Secured and firm like winter's ice
   Unaja   Unaja

Willow-Wand is not the only minstrel in his country; they all sing the whole day; they all compose songs and the women sing their husband's songs.

Sometimes the women too make their own songs. As far as I understood even the majority of them have their own little song the words of which they have thought out themselves. However, it would otherwise appear that the gift of song is especially confined to the men. When I asked Willow-Wand how many songs he had made he replied without actually knowing how poetically:

"How many songs I possess I cannot say. That is something I never count. I only know that I have many, and all of me is song. I sing when I breathe."

This answer was not intended to be poetical, but just therefore it becomes doubly so. They speak so simply and artlessly regarding their moods and feelings, that involuntarily it is art.

Willow-Wand never called his wife by name. He always called her "my little sister", her real name was "The Source". I took down one of her songs too. It dealt with her son "The Frostbitten", their only sorrow.

A few years ago he had murdered a man, a hunting comrade, for whom, for some reason or other, he had borne a grudge; now he lived outlawed in the mountains round Pelly Bay.

According to the laws of his tribe he had not actually committed a crime, for if one has an enemy it is justifiable to kill him. The Royal Canadian Mounted Police, however, have a station at Chesterfield and have announced that no man may kill another. And several instances are known of patrols being sent out to catch murderers and take them to the white man's country. The fear of this fate outlawed "The Frostbitten".

The song of "The Source", Willow-Wand's wife, deals with a bad mother who had not understood the bringing up of her son, and in its simple straight-forward language it is a striking expression of her sorrow.

Willow-Wand had a big salmon depot and also a reindeer depot which we bought. But in order to get hold of the latter we had to find "The Frostbitten".

We knew that this would be no easy matter as he had hidden himself in the mountains far from the common sledge track. The hiding place, or rather the surrounding country was, however, carefully described to us; therefore we decided to seek the murderer in his lair, in order to obtain his aid in finding the depots in question that were of vital interest to us should we decide to linger among the Arviligjuarmiut.

Father, mother, and sons were eager in their assurances that no evil would befall us if only we went unarmed to his snow-hut. But the task was, however, not an easy one. To begin with, it is not so very simple to find a white snow-hut, hidden among snow-drifts in a white country, then again it is scarcely tempting to visit a murderer unarmed, knowing beforehand that he has a gun, a bow and a spear. However, we decided to chance it.

We almost reached the mouth of the great Arviligjuaq stream near a steep mountain pass, called Kitigjuaq, to the place where the salmon depot was supposed to be. From there it was our intention to drive southwards into the interior of the country to find "The Frostbitten".

The finding of the salmon depot caused us no difficulties; it lay in the vicinity where our snow-hut had to be built. But the size of the depot gave us a pleasant surprise, for it proved that we, for one pound of tea, one pound of sugar, twenty plugs of Cavendish, and a small knife, had purchased about one hundred salmon weighing in all about 700 pounds. Fine fat salt-water trout, splendid grub for the dogs and also, by the way, for us.

Our great adventure started on a fine, sunny morning. As our cautious friend "The Willow-Wand" had advised us to be but two when seeking his son, only Anarqaq and I crossed the delta of the river where enormous clayey banks had formed a sort of mighty amphitheatre, highly effective in the flat landscape. Across vast plains we drive inland gazing eagerly for footprints in the white new-fallen snow. Finally our dogs found a scent, they broke into a gallop, a small snow-hut became visible, and in the course of a few minutes we were there. We pull the dogs up a few paces from the hut and run ahead eager to get over the excitement naturally associated with our first meeting. But to our great disappointment we see sledge tracks in a northern direction. "The Frostbitten" presumably heard our dogs the day before, for the tracks prove that he has left with his wife and foster-son almost at the time we arrived at the stream. For the feeding of two teams of dogs is unfortunately not an absolutely silent job.

The Frostbitten had only taken the most necessary with him. Even the blubber bag was left behind in the house. At some distance from the hut large blocks of snow in human shape were erected on the snow. They were of the kind which the Eskimos use for target practice. And the many foot prints visible among the targets showed that the man we were seeking had not missed the opportunity of practicing his eye and arm.

We immediately swung our dogs on to the tracks and set out in pursuit of the fugitives that could not be far away as they had no dogs and had left with a hand sledge. The track led us down on the sea ice on Pelly Bay, and our eager gaze discovered two black spots far away looking like two ravens on an ice barrier. On approaching we saw that they were two men standing on a couple of ice blocks. Now and again they jumped down and ran to and fro. They seemed to be rather nervous and excited. Anarqaq took out our snow-knives, saying:

"Better to be prepared. The Frostbitten is a man, a real man, and should he think that we are enemies, he will steal a march upon us."

(Continued in next week's News-Letter)

VOLTAGE OF THUNDERBOLTS DETERMINED AS 100,000,000

Science has measured the thunderbolt. The voltage of an average lightning flash has been determined to be about 100,000,000 volts, Dr. F.W. Peek, jr., engineer in charge of the General Electric Company's high tension laboratory at Pittsfield, Mass., recently told members of the Franklin Institute. The voltage was not measured directly, he said, but by comparison with phenomena observed in the study of "artificial lightning".

It was found that when one of these made-to-order thunderbolts struck the ground at a distance from a transmission line corresponding to a real lightning flash at a distance of 1,000 feet, that a voltage of approximately oneper cent of the flash was induced in the transmission line. Measurements of induced voltages in real transmission lines following lightning flashes show them to be of the order of 1,000,000 volts; hence the deduction is made that the force of a real bolt is 100 times that amount.

The lightning generator devised by Mr. Peek for the investigation of these problems has produced as much as 2,000,000 volts at millions of horse power, he told the audience.

"Bolts from the generator have all the characteristics of real lightning. Large wooden posts are splintered and blown apart and miniature houses destroyed when unprotected by lightning rods. Even the thunder is simulated. When a bolt of real lightning strikes a sandy place its path is defined by a glass-like tube of fused sand called a fulgurite. These tubes have also been produced with artificial lightning."

The purpose of these investigations was to find means of remedying the danger to high-power transmission lines from lightning strokes nearby. It is not necessary for lightning to strike such a line to cause much trouble, Mr. Peek told his audience. A lightning stroke a mile away may cause very high voltages in the line by induction, and these induced strokes, which travel over the line with the velocity of light, are in fact the cause of most of the trouble. In order to study these effects a model section of country was constructed with transmission line, cloud and lightning stroke all built very accurately to scale.

RADIO FANS TO LISTEN FOR FELLOWS OVERSEAS

American and Canadian radio fans will be the listeners and European amateurs the performers at the coming fourth annual series of transatlantic tests which will begin the evening of December 22 and continue until January 10. Europe will do all the talking and America will keep all transmitters silent during the entire period, listening for signals from overseas.

During the three previous transatlantic amateur radio tests the emphasis has been laid by American operators on transmission. This was carried to such an extent as to interfere seriously last year with the hearing of the few European operators who were able to put their stuff across to America. As a result there were symptoms of a slight annoyance on the part of the Old World fans who felt they had not been dealt with quite fairly.

All this is to be changed this year and the British and French boys are to be given a free field for an invasion of the air of the United States for the duration of the tests. Afterwards will come the free-for-all two-way tests which will follow the last day of the transatlantics.

According to the program arranged by F. H. Schnell, traffic manager of the American Radio Relay League, the ball will be opened by French amateurs on the night of December 22. The Britishers will have their turn the succeeding night and the alternation will continue as long as the tests continue.

More than 300 American stations were heard in Europe during the transatlantic tests last year, but owing to the emphasis on the transmission side of the game only 20 stations here heard any signals from amateurs across the Atlantic. This year the American fans are expecting to surpass all receiving records.

EXPERTS EXPLAIN WHY RADIO AT NIGHT GOES FARTHER

Why radio signals on short wave-lengths cover great distances at night is explained in the U.S. Bureau of Standards' analysis of 5,000 records secured in a series of tests made by the American Radio Relay League.

In daytime, the government experts say, the radio waves are transmitted largely along the surface of the earth and the parts of the waves radiating upward are absorbed by the atmosphere.

Night transmission, however, especially for great distances and using short wave-lengths, is probably by means of waves transmitted along the Heaviside surface, a highly conducting layer at a height of about 60 miles above the surface of the earth. Waves at night are thus free from the absorption encountered in the daytime, but are subject to the great variations caused by irregularities of the ionized air at or near the Heaviside surface. The transmission along this surface with relatively little absorption may thus account for the long distances covered at night, while the variations in such absorption as is present probably account for the fading.

General Cloudiness over the region between stations was found to cause severe fading.

READING REFERENCE - Dellinger, J.H. and Whittemore, L.E. Lefax Radio Handbook. Philadelphia, Lefax, Inc., Publishers, 1922-23

EYE DEFECTS AID DIAGNOSIS OF INSANE

In the human eye may be seen records of weaknesses and degeneracy when such deficiencies are congenital rather than acquired during life, Dr. Charles R. Stockard of the Cornell Medical School in New York told the National Academy of Sciences meeting at Ithaca. So sensitive is the eye in animals that if development before birth is arrested in any point even temporarily it will be affected.

Through experiments on fish eggs, Dr. Stockard has been able to prove that eyes which develop during the whole growth of the embryo will be damaged whenever any other organs are retarded or otherwise damaged. He is able to produce at will any desired deformity in the fish by simply chilling the eggs at the time when the particular part is growing most rapidly. By this means he has successfully hatched fish without eyes or ears or kidneys ninety times out of a hundred.

What he has learned from his experiments on animals and fishes has been used by Dr. Stockard in studying the eye defects of insane and feeble-minded persons. Eye trouble was found to be prevalent in inmates whose weaknesses were present at birth, and Dr. Stockard believes that careful study of the eyes will allow better diagnoses to be made in many such cases.

PRESENTS DINOSAUR TRACKS TO GOVERNMENT INSTITUTION

Tracks of the long-legged dinosaur, with a stride of 56 inches, which roamed this region some 25,000,000 years before Virginia's famous first families arrived, have been presented to the United States National Museum by F. C. Littleton, who lives at President Monroe's old place near Aldie, Va.

Mr. Littleton is giving a prehistoric touch to his historic home by placing slabs containing other tracks of this ancient reptile in his front porch.

After examination of the tracks, Dr. C.W. Gilmore, palaeontologist of the National Museum, said that they were probably made by one of the meat-eating species of dinosaurs. He deduced this diet from the sharpness of the claws evidenced by the imprints in the stone. The herbiverous forms had flatter, more hoof-like claws,he said. The tracks of this three-toed monster which apparently walked on its hind legs, were 56 inches apart. It has not yet been determined whether the reptile was running or walking, but further study and comparison with other dinosaur remains is expected to yield more exact information. The indications are that the animal was long-limbed, Dr. Gilmore stated.

This is the first time dinosaur tracks have been found in the state of Virginia. In reconstructing the porches of his house, Mr. Littleton wanted to get material like that President Monroe had used in the original structure, and suspected that these slabs were obtained from a quarry on the place. In digging the stones for the new porch, the dinosaur tracks were discovered. When the stones in the old porch were torn up, on the under side other dinosaur tracks were found. President Monroe's workmen evidently passed up a great palaeontological discovery.

A 7,500 ton office building in Chicago, said to be the heaviest building ever moved, was recently transferred without any damage to a new site 85 feet away.

A new high power wireless station using a wave length of 16,000 meters is to be placed in operation in South Africa in about 18 months.

EAT, GROW FAT AND DIE, SAYS DOCTOR

"Eat, drink, and grow fat, and tomorrow you die," Dr. K. H. Beall of Ft. Worth, Texas., told members of the Southern Medical Association at their Washington meeting. Excess fat saps the health and strength of its victims, and predisposes them to disease and to premature old age, he said.

"We are all acquainted with the lean, long-waisted individual who spends his life in trying first one treatment and then another in a vain effort to get fat. He ought to be thankful to be able to remain thin. If tuberculosis doesn't get him before he is 40 he is reasonably sure to live to old age and finally to succomb not to any particular disease, but rather to a general sort of mild decay.

"Time was when fat was an asset to a man. It was a valuable reserve to carry through periods of famine. The need for it has been banished by civilization." Men of middle age who are more than 25 pounds overweight have an expectancy of life of only 15 years as compared with an expectancy of 35 years in thin people, he continued.

"A four-inch excess in a man's waist line and 25 pounds extra fat reduces his probable length of life by 40 per cent. We may well say that a man's belt is his life line."

Dr. Beall said that in view of the fact that there had been no extension of life after middle age for a century, and that the degenerative diseases were nearly all due to overweight, the complacency of the medical profession toward obesity was inexcusable. Laymen understood the risk nearly as well as doctors did, he said.

A man 30 pounds overweight carries around 25 miles of additional blood vessels to nourish and maintain the "excess baggage" on his person, the doctor continued, and this extra strain he maintained was the cause of heart and kidney breakdowns in later life. Overweight was a handicap in all infectious diseases, and especially in pneumonia; and fattening of tuberculous patients beyond normal was condemned. As for diabetes, he said, "We may well say that to get diabetes you must first get fat."

In the ensuing discussion, Dr. Beall's conclusions were commended and Dr. Seale Harris of Birmingham said that his paper should have wide publicity because of the importance of the subject and the need of arousing the public to the danger of overweight.

What is said will be the longest "White way" in the South is to be made by electrically lighting the thirty-two mile concrete highway between the cities of Dallas, and Fort Worth, Texas.

There are 3,000 separate milk routes in the city of London.

TABLOID BOOK REVIEW

FAULT MAP OF CALIFORNIA. Issued by the Seismological Society of America. S.D. Townley, secretary. $5.00 per set, postpaid.

This is a set of charts to be used by those who go in search of earthquakes in California. In red and green lines, the places where the earth is alive are marked. Interesting also are the undersea contour lines determined by sonic depth finding from U.S. destroyers off the California coast. An article by Dr. Bailey Willis in the March 1923 Bulletin of the Society explains the map.

LYDGATE'S FALL OF PRINCES, Edited by Henry Bergen. Washington, Carnegie Institution of Washington Publication No. 262, 1923.

In Lydgate's Fall of Princes the Carnegie Institution publishes a document of considerable historical and philological importance which has not been published before since the sixteenth century. It covers three bulky volumes and consists of 36,365 lines of decasyllabic verse; being an old English translation of a French prose translation of the Latin historical work De Casibus Virorum Illustrium by the great Italian poet and scientist, Boccaccio. It should be interesting to the scholar of Chaucerian English.

MACMILLAN ANNOUNCES BY RADIO ERECTION OF POLAR OBSERVATORY

The northernmost magnetic observatory in the world has just been established by the Carnegie Institution of Washington and the Macmillan Arctic Expedition at Refuge Bay, northern Greenland. The beginning of observations by R. H. Goddard of the Institution's staff is announced in a relayed radio message from Donald Macmillan, leader of the expedition, to Dr. Louis A. Bauer, director of the department of terrestrial magnetism of the Institution.

The observatory consists of an especially designed wooden building encased by a snow house to protect the instruments from sudden temperature changes. Its location is 550 miles north-northeast of the magnetic north pole, and some 700 miles south of the geographic north pole, in latitude 78 degrees, 3 minutes north, and longitude 72 degrees, 27 minutes west. The taking of observations here is part of a comprehensive plan for a world-wide study of the intensity and variability of the mysterious force which causes the compass to point either east or west of true north to an extent depending upon the position of the observer. The data collected may also throw light on any possible connection between these variations in the earth's magnetism and northern lights, sun spots, and "static" which often interferes with radio communication.

The building which houses the instruments for making continuous photographic records of the variations of the magnetic elements and the variations of the atmospheric electric potential gradient is especially designed to preserve a constant temperature. Its parts were made in Wiscasset, Maine, and assembled on the present site in the far north, where the observations will probably be made until the expedition returns to this country next September. The importance of data in regard to the earth's magnetism is indicated by the fact that while all our commerce on the seas is largely dependent upon the compass, the compass cannot be safely used in navigation unless it is known how much the needle is deflected from the true north. In sailing from Alaska to San Francisco, for instance, a ship might be some distance west of California toward the Hawaiian Islands if allowance were not made for the changes in compass direction.
